

# Community Design and Physical Activity – What do we know?

And what DON'T we know?

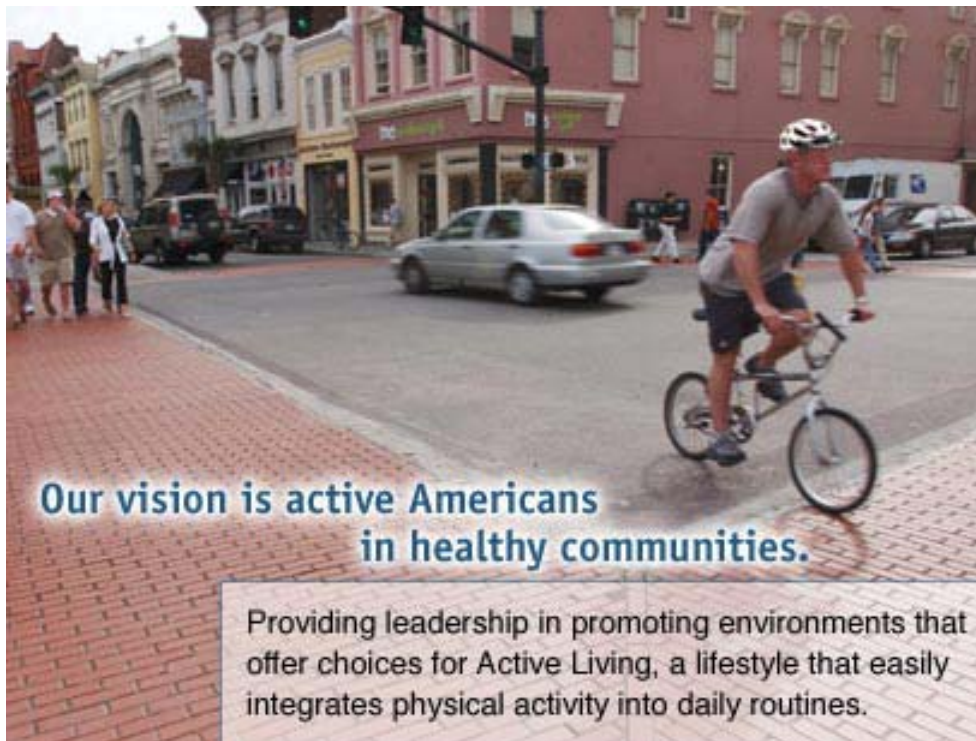
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## ACTIVE LIVING BY DESIGN

Increasing physical activity through  
community design



**Our vision is active Americans  
in healthy communities.**

Providing leadership in promoting environments that offer choices for Active Living, a lifestyle that easily integrates physical activity into daily routines.



# Outline

- Definitions and Model
- Adults and physical activity
- Children and physical activity
- Trade-offs
- Conclusions

# 1. Definitions

- Physical Activity
- Community Design
- Conceptual Model



# Physical Activity Types

	Walk/Bike for travel	Walk/bike/ run for exercise	Stationary physical activity
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# Physical Activity Types

Settings	Walk/Bike for travel	Walk/bike/ run for exercise	Stationary physical activity
Home			
Street			
Neighbor- hood			

# Physical Activity Types

Participants \	Walk/Bike for travel	Walk/bike/ run for exercise	Stationary physical activity
Parents alone			
Children alone			
Parents & Children			



# Community Design = Built Environment

- Land use – what activities where
- Transportation system – how linked
- Design – aesthetic features



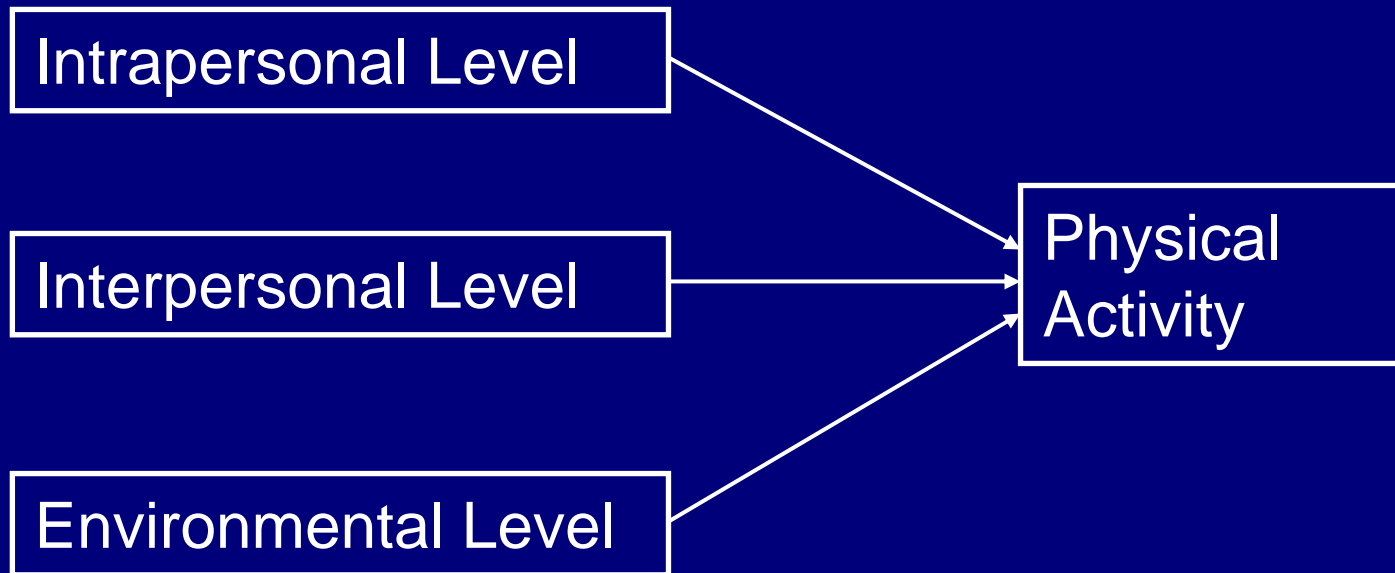


# Community Design = Physical Environment

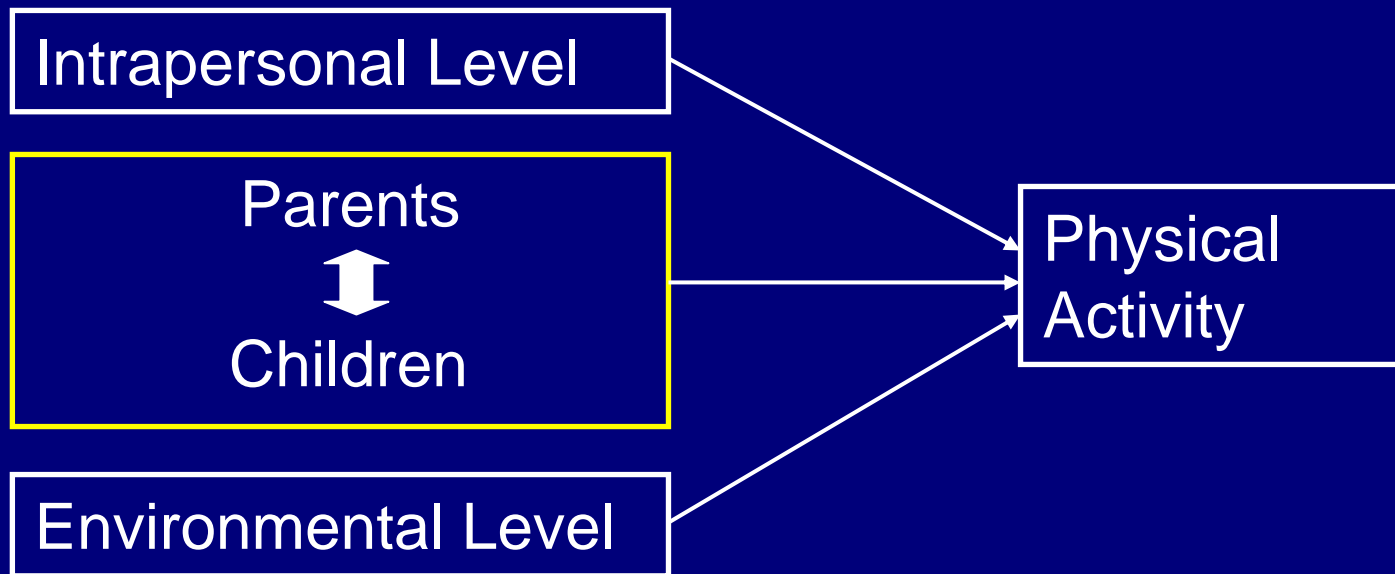
- Land use – what activities where
- Transportation system – how linked
- Design – aesthetic features
- Natural landscape – trees, grass, etc.
- Human use – other people



# Conceptual Model



# Conceptual Model

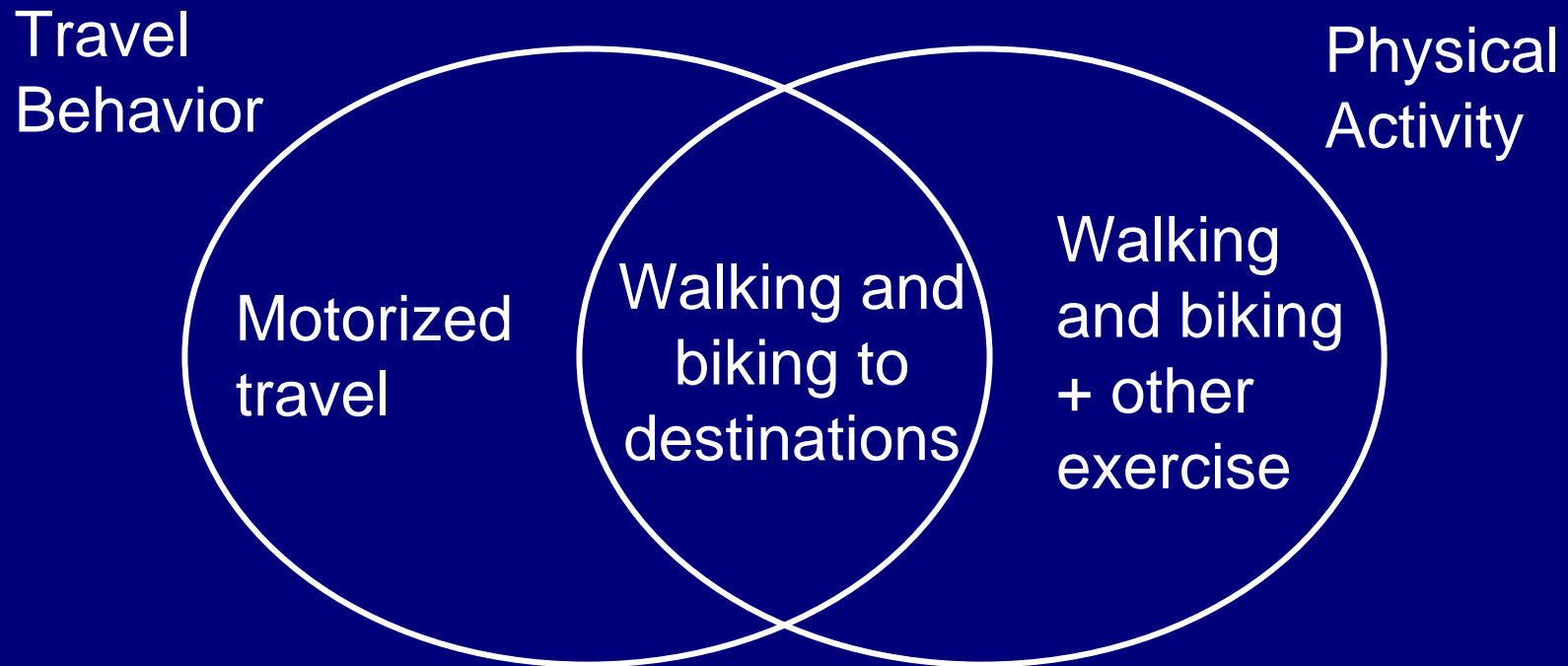


## 2. Adults and Physical Activity

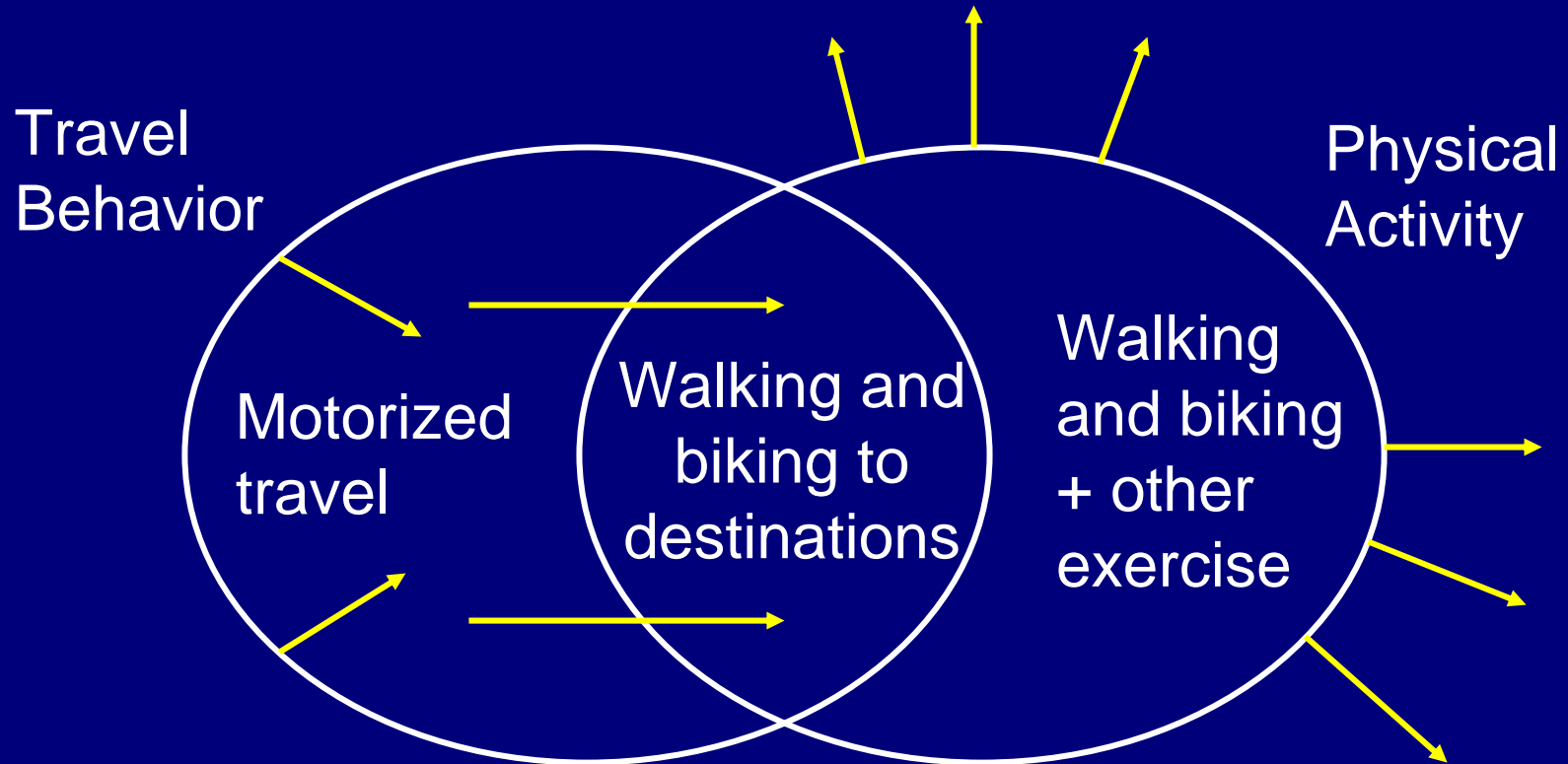
- Travel behavior research
- Physical activity research



# Overlapping Concerns



# Differing Motivations



# Differences by Field

	Travel Behavior Research	Physical Activity Research
Theory	Utility-maximizing framework	Ecological framework
Data	Diary surveys	Accelerometers, self-reports
Design	Cross-sectional	Interventions or cross-sectional



# TRB-IOM Review\*

- 22 Travel behavior studies
- 28 Physical activity studies
- Cross-sectional = “Least Suitable”

\*S. Handy. “Critical Assessment of the Literature on the Relationships Among Transportation, Land Use, and Physical Activity,” Paper prepared for the Transportation Research Board and Institute of Medicine Committee on Physical Activity, Health, Transportation, and Land Use, February 2004.

# Travel Behavior Findings

- Walking and biking are higher in traditional/transit/walkable neighborhoods
- Walking and biking are lower in suburban/automobile neighborhoods

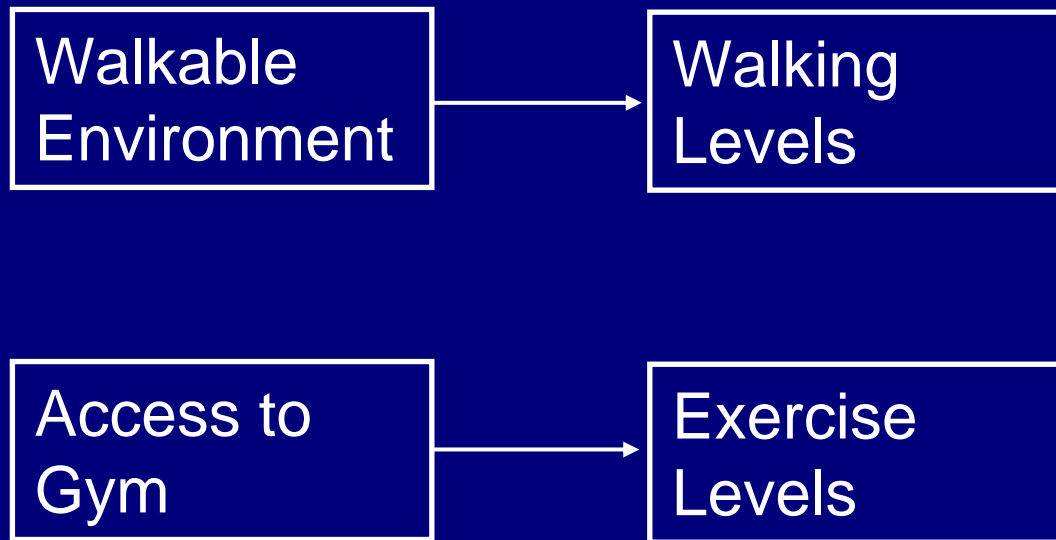
# Travel Behavior Findings

- Population density is positively correlated with walking and/or biking
- Distance to the nearest destination is negatively correlated with walking/biking
- Accessibility is positively correlated with walking/biking
- Design variables are largely insignificant

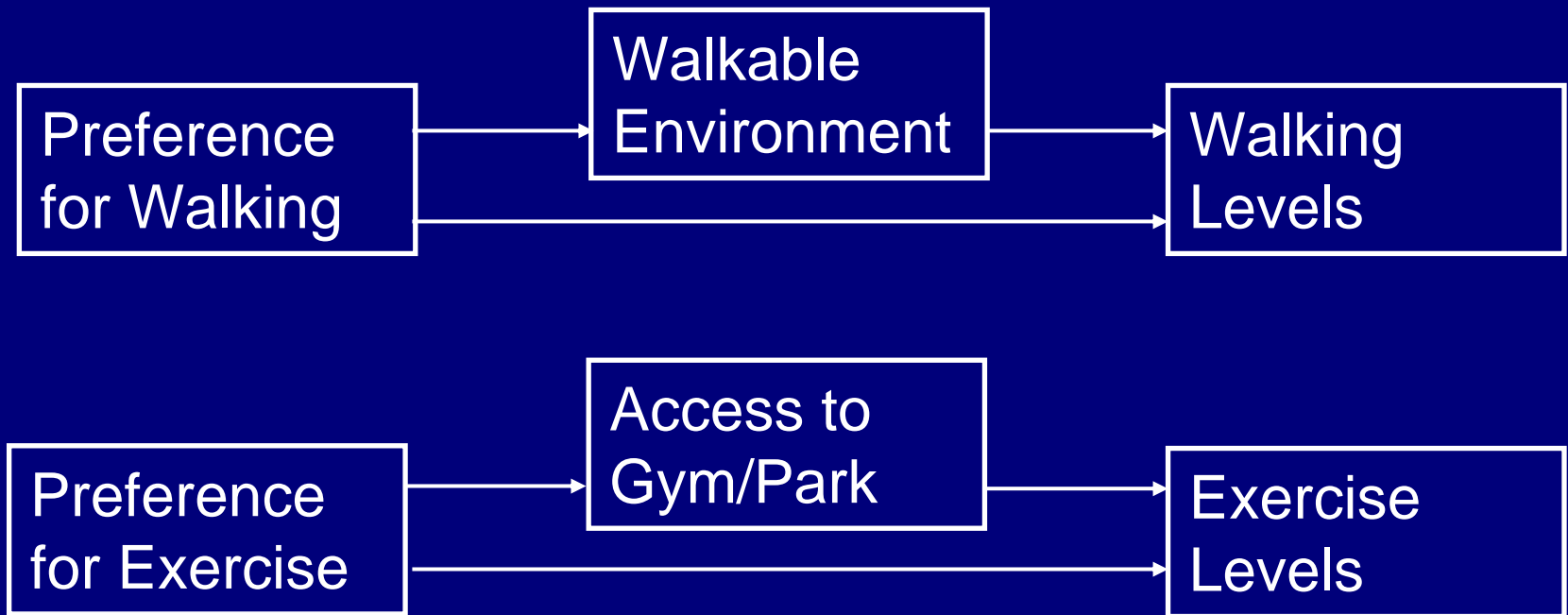
# Physical Activity Findings

- Accessibility is positively correlated with total physical activity
- Distance to trail or bikeway is negatively correlated with use of facility
- Reported presence of sidewalks are positively correlated with walking
- Perceived neighborhood aesthetics are positively correlated with walking

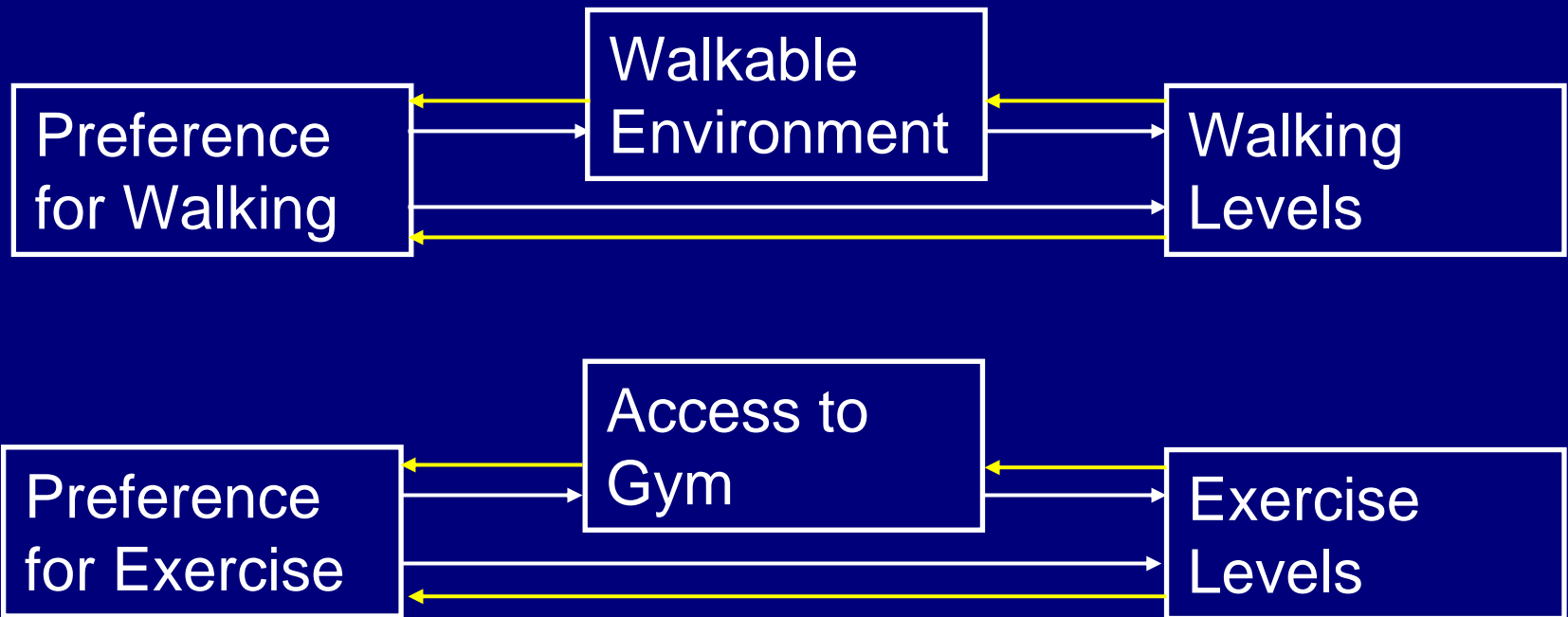
# Assumed Causality



# Possible Causality



# Possible Causality





# What Don't We Know?

- To what degree does “self-selection” explain the observed correlations between community design and physical activity?
- Can community design do more than facilitate physical activity for motivated individuals? ... change motivation?  
... change preferences?

# 3. Children and Physical Activity

- Traffic Safety Studies
- Physical Activity Studies
  - Cross-sectional
  - Interventions
  - Few that study the role of community design



# Physical Activity - Neighborhood Safety

- Zakarian, et al. 1994: Perceived neighborhood safety not correlated with vigorous exercise outside of school for 9<sup>th</sup> and 11<sup>th</sup> graders.
- Romero, et al. 2001: Perception of more neighborhood hazards positively associated with physical activity for 4<sup>th</sup> graders
- Molnar, et al. 2004: Lower neighborhood safety and social disorder associated with less physical activity

# Physical Activity – Proximity to Playgrounds

- Sallis, et al. 1993: Proximity to playgrounds positively associated with physical activity for preschool children
- Burdette and Whittaker, 2004: Proximity to playgrounds not associated with overweight for preschool children in low-income neighborhoods

# Traffic Safety

- Jacobsen, et al. 2000: Traffic speed is a key determinant of pedestrian injury risk for children
- Tester, et al. 2004: Speed humps were associated with lower odds of children being injured within their neighborhoods and being struck in front of their home

# Safe Routes to School

- Staunton, et al., 2003: 64% increase in number of children walking and 114% increase in number of students biking in 7 schools in Marin County
- Boarnet, et al., 2004: Increases in the number of children walking or bicycling for five of nine schools in So. Cal.
- Cooper, et al. 2003: Boys who walk to school are more active than those who are driven

# Physical Activity – Sallis, et al. Review\*

- Time spent outdoors is positively associated with physical activity for children
- Opportunities to exercise are positively associated with physical activity for adolescents

\*Sallis, J., J. Prochaska, and W.C. Taylor. "A review of correlates of physical activity of children and adolescents," *Medicine and Science in Sports and Exercise* 32(5): 963-975, 2000.



# What Don't We Know?

- What kinds of community design are best for getting children and adolescents outside to exercise?
  - Backyards, front yards, streets, parks, community centers, etc.?
  - Differences by age and gender?

## 4. Compatibility?

Community  
design for  
parents

?  
=

Community  
design for  
children



# Some Really Preliminary New Evidence

- PIs: S. Handy and P. Mokhtarian
- Funders:
  - Caltrans – California Dept. of Transportation
  - Robert Wood Johnson Foundation
  - University of California Transportation Centers

# Selection of Neighborhoods

	Traditional Neighborhood	Suburban Neighborhood
Large Metro Area	Mountain View Sac Midtown	Sunnyvale Sac Suburban
Stand-Alone City	Santa Rosa JC Modesto Central	Santa Rosa RV Modesto Fringe

# Sacramento - Midtown



# Sacramento - Suburban



# Survey Implementation

- Mail-out, mail-back
- October-November 2003
- 8000 addresses initially
- 6746 valid addresses
- 1672 responses – about 200 per neighborhood
- 24.8% response rate



# Physical Activity Measures

- Number of days in last 7 days that **children living with respondent** played outside somewhere in neighborhood other than backyard
- Number of days in last 7 days that **respondent** exercised somewhere in neighborhood hard enough to breathe somewhat harder than normal for at least 10 minutes

# Physical Activity Measures

- Number of times in last 30 days that **respondent** walked or strolled around the neighborhood
- Number of times in last 30 days that **respondent** walked to a local store or shopping area

# Traditional vs. Suburban

	Traditional neighborhoods	Suburban neighborhoods
Exercise in neighborhood	2.13	1.55
Walk/stroll in neighborhood		
Walk to store		
Children's play		

# Traditional vs. Suburban

	Traditional neighborhoods	Suburban neighborhoods
Exercise in neighborhood	2.13	1.55
Walk/stroll in neighborhood	9.71	7.75
Walk to store		
Children's play		

# Traditional vs. Suburban

	Traditional neighborhoods	Suburban neighborhoods
Exercise in neighborhood	2.13	1.55
Walk/stroll in neighborhood	9.71	7.75
Walk to store	4.67	1.60
Children's play		

# Traditional vs. Suburban

	Traditional neighborhoods	Suburban neighborhoods
Exercise in neighborhood	2.13	1.55
Walk/stroll in neighborhood	9.71	7.75
Walk to store	4.67	1.60
Children's play	1.54	2.24

# Cul-de-Sac vs. Not

	Live on Cul-de-Sac	Not Live on Cul-de-Sac
Exercise in neighborhood	1.75	1.83
Walk/stroll in neighborhood		
Walk to store		
Children's play		

# Cul-de-Sac vs. Not

	Live on Cul-de-Sac	Not Live on Cul-de-Sac
Exercise in neighborhood	1.75	1.83
Walk/stroll in neighborhood	8.08	8.77
Walk to store		
Children's play		



# Cul-de-Sac vs. Not

	Live on Cul-de-Sac	Not Live on Cul-de-Sac
Exercise in neighborhood	1.75	1.83
Walk/stroll in neighborhood	8.08	8.77
Walk to store	2.27	3.16
Children's play		

# Cul-de-Sac vs. Not

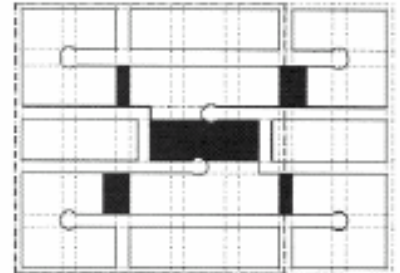
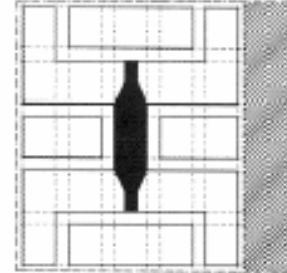
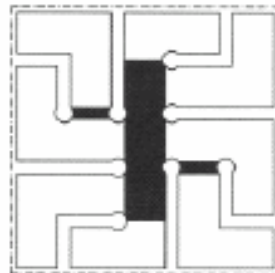
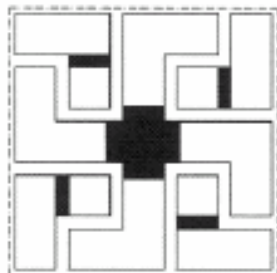
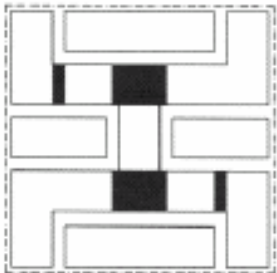
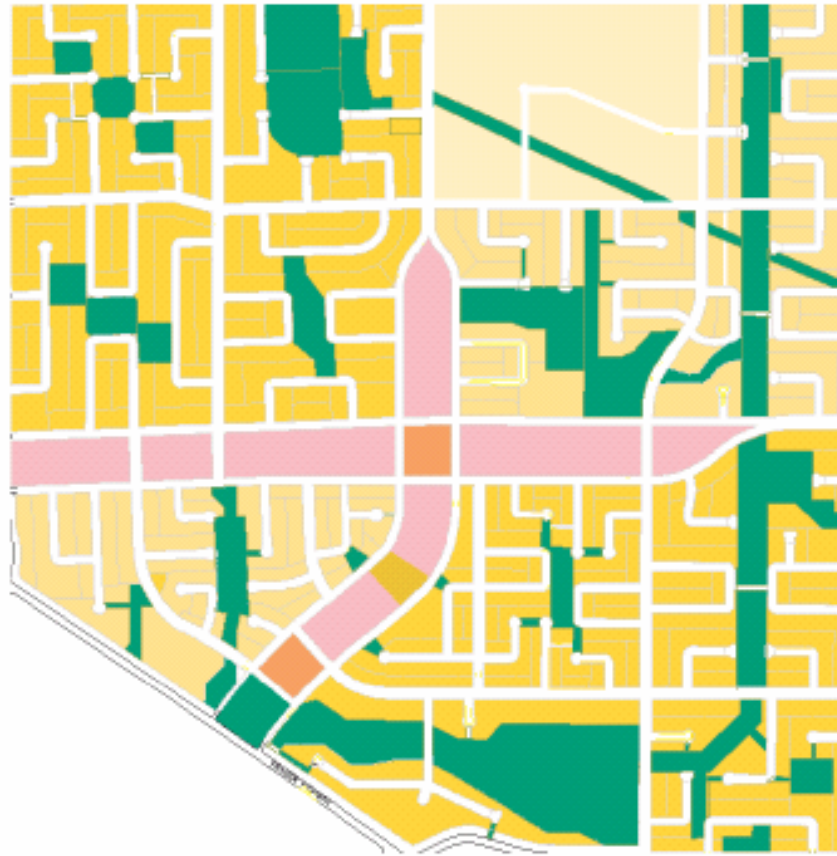
	Live on Cul-de-Sac	Not Live on Cul-de-Sac
Exercise in neighborhood	1.75	1.83
Walk/stroll in neighborhood	8.08	8.77
Walk to store	2.27	3.16
Children's play	2.68	1.75

# What Don't We Know?

- Is it possible that suburban neighborhoods really are better for promoting physical activity in kids?
- If so, to what degree does the increase in physical activity for kids make up for the decrease in physical activity for their parents?
- And what forms of community design can effectively encourage physical activity for parents and kids alike?

# Rethinking the Grid

- The Housing Zone, 2004: The new new urbanism – hybrids
- Southworth and Ben-Joseph, 2004: “...much can be said in favor of the cul-de-sac street as a pattern for neighborhood space”
- Canada Mortgage and Housing Corporation, 2003: The Fused Grid



## 5. Conclusions

- Given all that we don't know, we can't say that changes in community design will lead to increases in physical activity.

## 5. Conclusions

- Given what we do know, we can say that changes in community design will increase the opportunities for physical activity:
  - Slow speeds and low traffic streets
  - Parks, shops, etc. within walking distance

## 5. Conclusions

- In carrying out recommendations, be conscious of potential trade-offs between what is most effective for adults and what is most effective for children



# Community Design for Physical Activity

